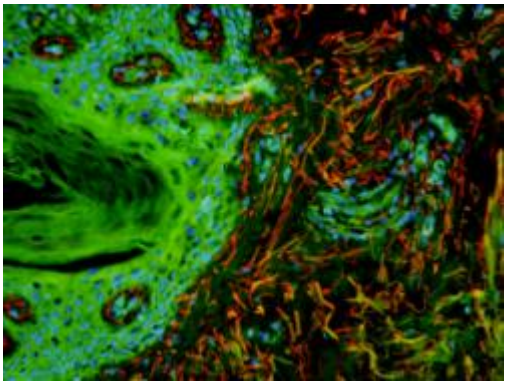
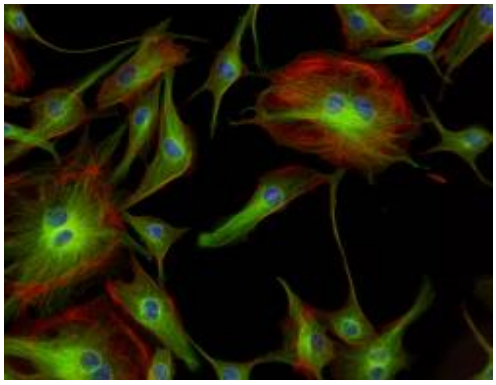
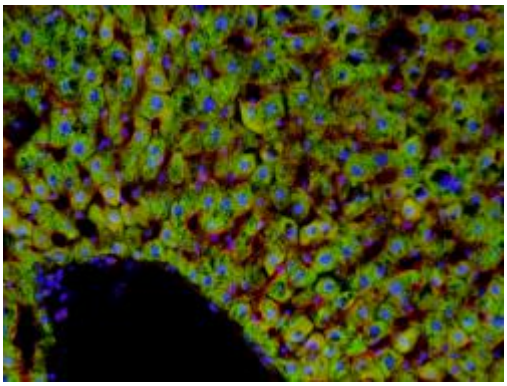
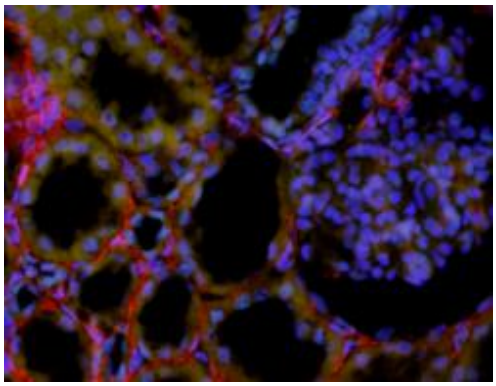
CoolLED
Simply Better Control

pE-4000

Firmware Update Instructions

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1. Introduction

Firmware updates to the CoolLED pE-4000 can now be implemented in the field using a small program and some hardware provided by CoolLED.

The software may be supplied on a USB memory stick along with the required hardware, or it may be downloaded from our website along with the latest firmware updates.

The firmware update procedure described in this document should only be carried out by individuals with a sufficient level of technical knowledge and training in handling live PCBs and electronic devices.

To request a firmware update pack or if you have any need for more information or instructions please contact support@coolled.com.

Due to changes in hardware over time, it is not possible to directly switch between Version 1.0 FIrmware and Version 2.0 Firmware. The substantial change will typically affect units sold before June 2016.
If this upgrade is required then please contact support@coolled.com

2. Check firmware level

You can check what level of firmware is currently installed on the pE-4000 system by using the control pod. While in Advanced mode press the '**settings**' button then press the '**+**' once on the large global intensity control. A screen similar to that shown in Figure 1 should appear giving the relevant information.

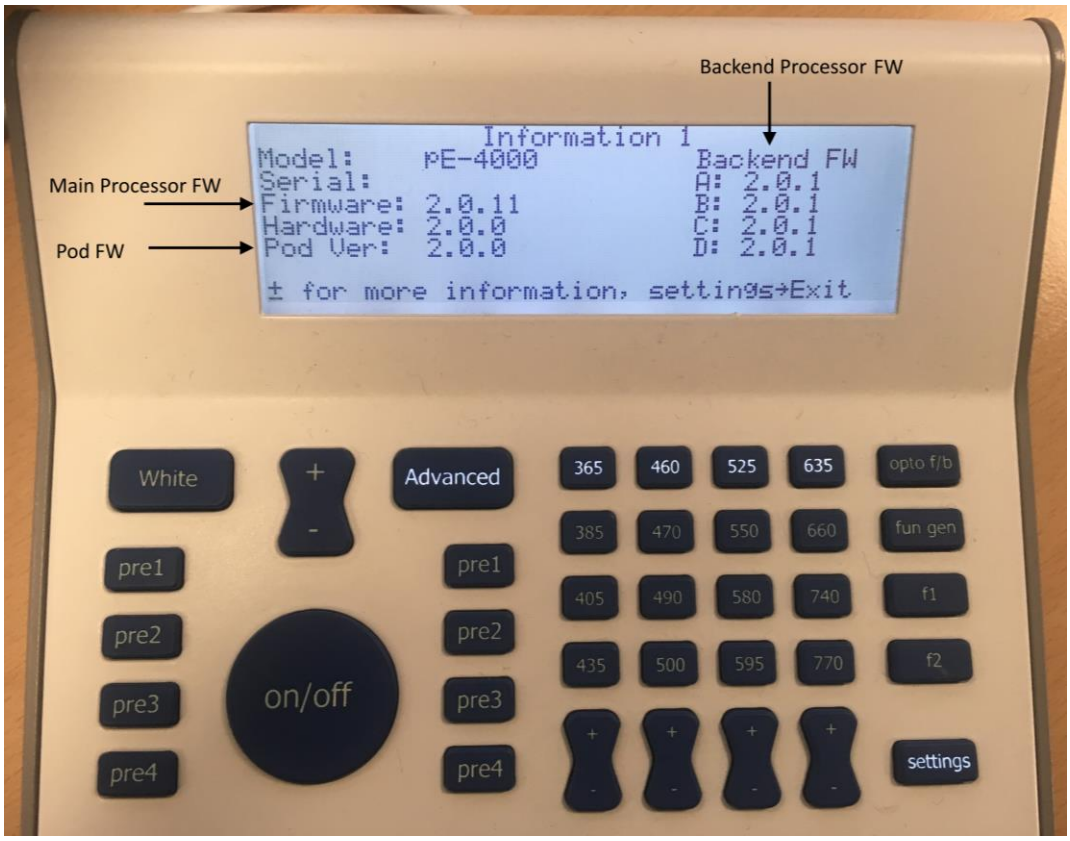


Figure 1. Firmware information screen on the pE-4000.

It is recommended that the latest version of firmware is installed. You will be able to find the latest firmware on our website downloads area. Please contact support@coolled.com for more information.

3. Installation

Download the programmer file ‘CoolLED-Programmer.zip’ or copy it over from the memory stick. We recommend saving the file in a folder on your desktop and unzipping there. Name the folder without using any spaces. The program will not run if there are any spaces anywhere in the path name leading to the

Once unzipped you will find the file ‘zadig_*.exe’ file within the CoolLED-Programmer Folder and the ‘pEx-Programmer.exe’ file within the pEx-Programmer folder.

Assemble the connector with the dongle orientated as shown in Figure 2. Plug the USB cable from your PC into the dongle as shown in Figure 3.

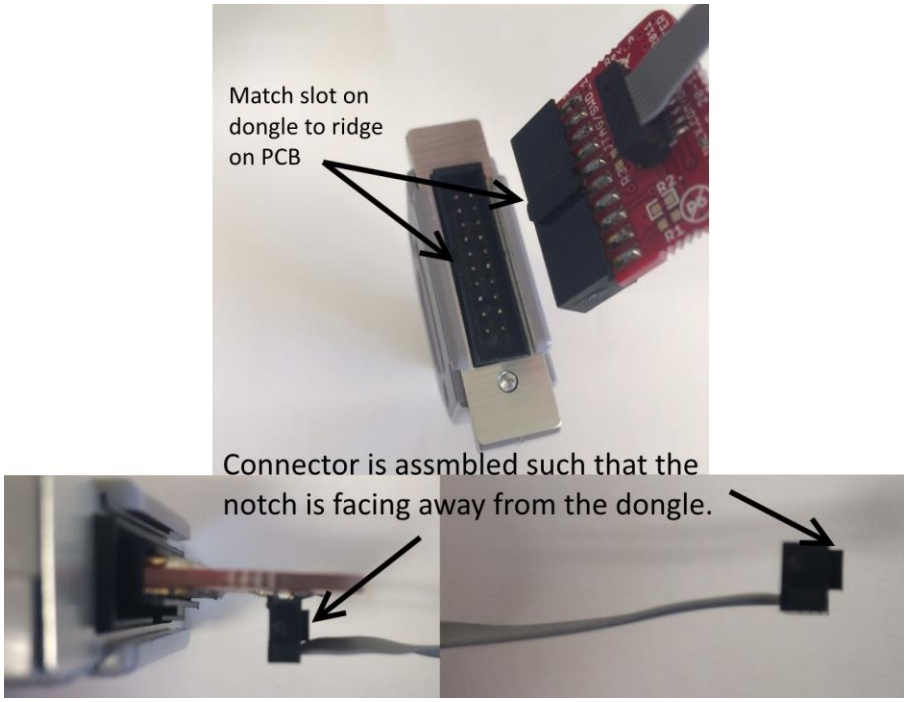


Figure 2. Dongle and cable orientation.

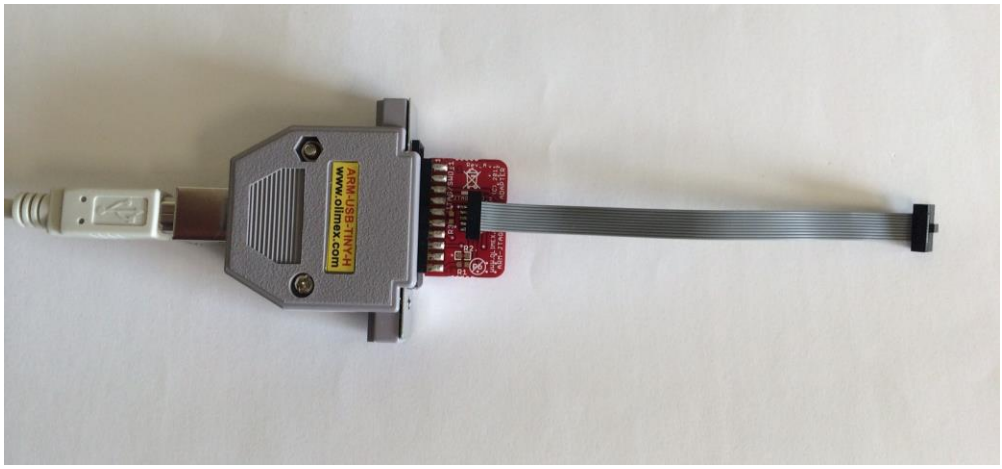


Figure 2. ARM-USB-TINY-H dongle for updating firmware.

Windows may attempt to find drivers but will fail. Pop-up screens similar to that shown in Figure 4 are likely and may be closed at any time.

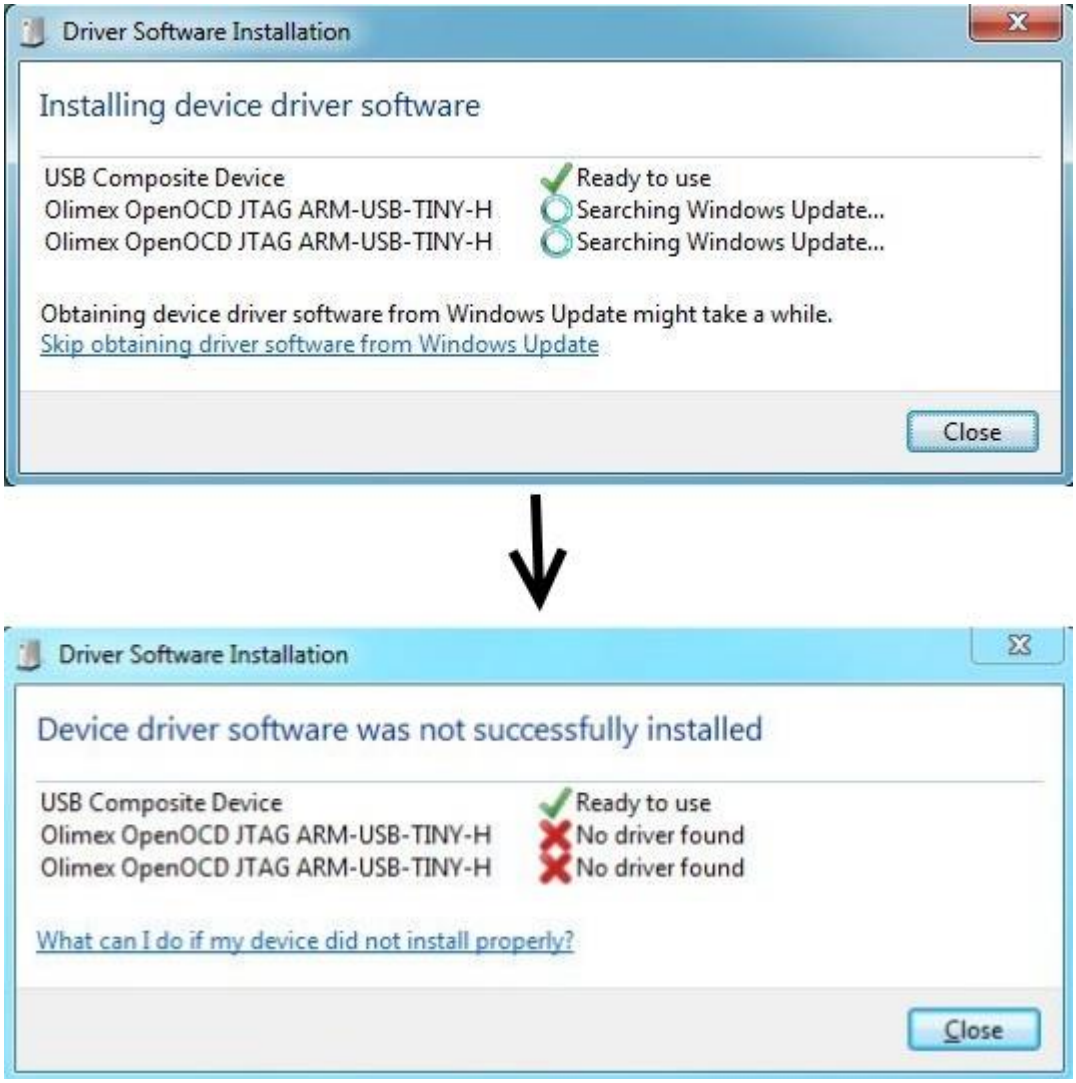


Figure 4.

To install the drivers double click on the file 'zadig_2.1.0.exe' to start the driver program needed by the JTAG dongle.

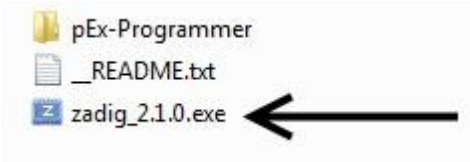


Figure 5

Now press the ‘Install Driver’ button as shown in Figure 6.

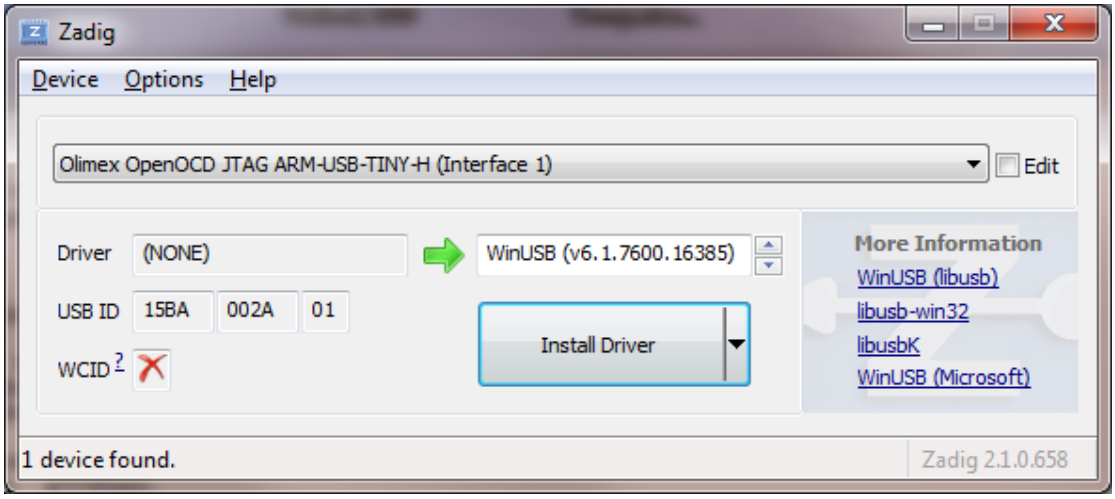


Figure 6. Zadig screen.

You may get the following pop-up as shown in Figure 6. Unless there is some installation problems there should be no need to allow the program to go online so you can press ‘No’ here.

Figure 7.

Once installed the following screens will appear as in Figure 8 and Figure 9. Now you can close this program.

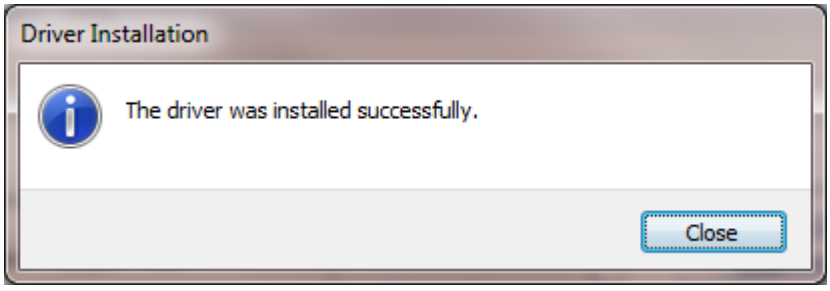


Figure 8.

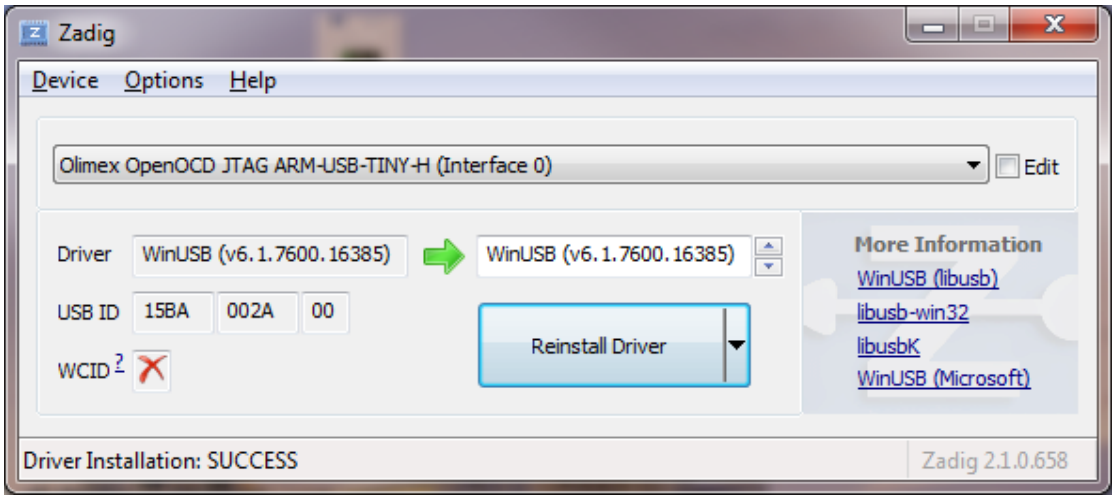


Figure 9.

You may get another pop-up stating that your PC should be restarted for the installation to be completed. If this occurs you should restart your PC.

4. Running the pE-Programmer

Open the folder pE-Programmer and run the ‘pEx-Programmer.exe’ by double clicking.

Figure 10.

The following two screens appear as in Figure 11.

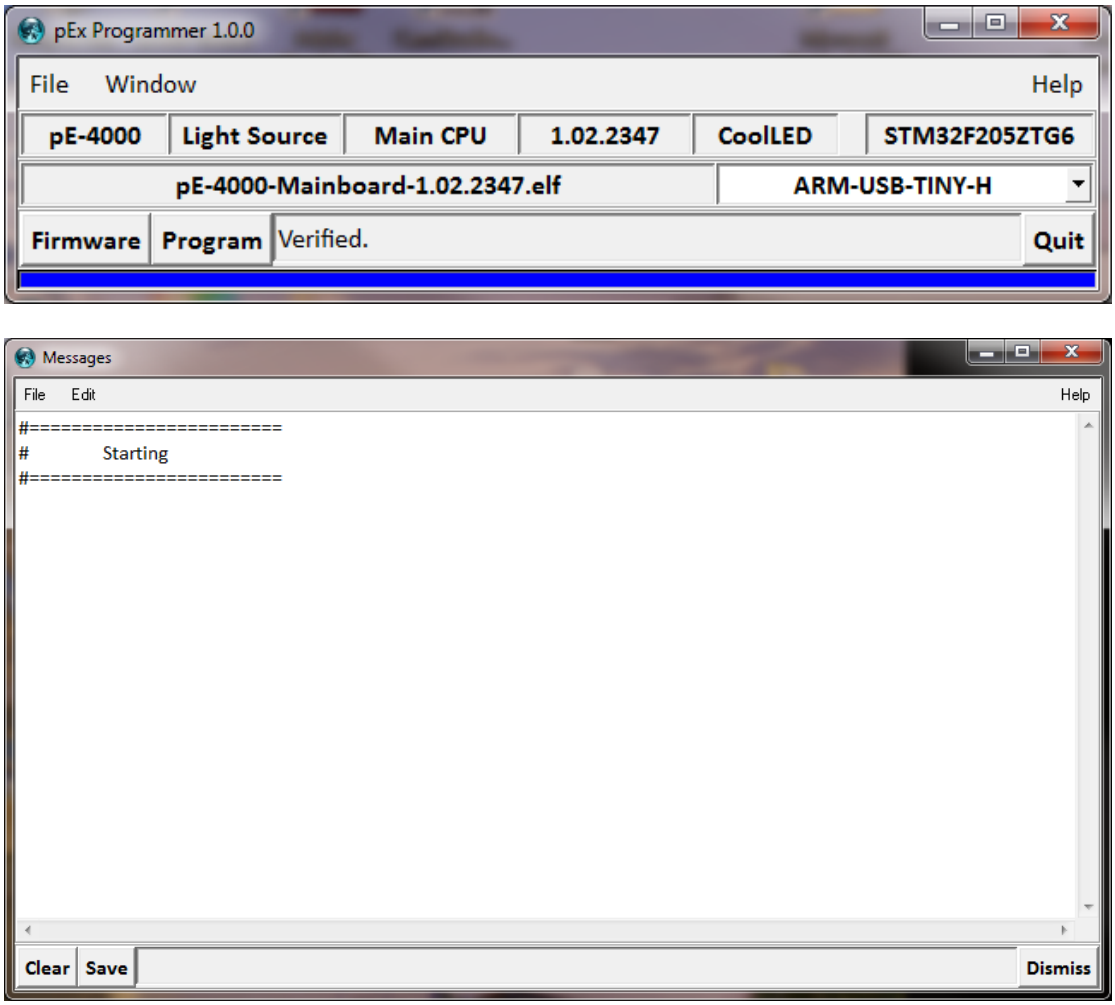


Figure 11.

Notice the ‘Firmware’ button shown on the bottom left hand side of the top screen in Figure 11. Click on this button to select the firmware you intend to install.

On the pE-4000 there are three distinct parts of firmware that can be updated. These are as follows:

1. Mainboard – This firmware is for the main processor on the PCB.

2. Backend – This firmware is intended for the four processors on the PCB that are dedicated to each channel of the pE-4000 system.

3. Pod – This firmware is for the pod processor.

After clicking on the 'Firmware' button a screen will appear showing the contents of the 'firmware' folder which can be found within the 'pE-Programmer'. This will give a choice of two folders corresponding to the light sources pE-300 and pE-4000. In this case you should open the pE-4000 folder. You will now see three more folders that relate to the three firmware parts of the pE-4000 as described in points 1-3 above. Open the required folder and chose the latest '.elf' file based on what firmware update is required.

To update the firmware the connector on the ARM-USB-TINY-H dongle must be connected to the connector for the mainboard or backend processors of the light source source PCB or the pod PCB. The connector on the product PCBs are all 10 pin type as shown in Figure 12.

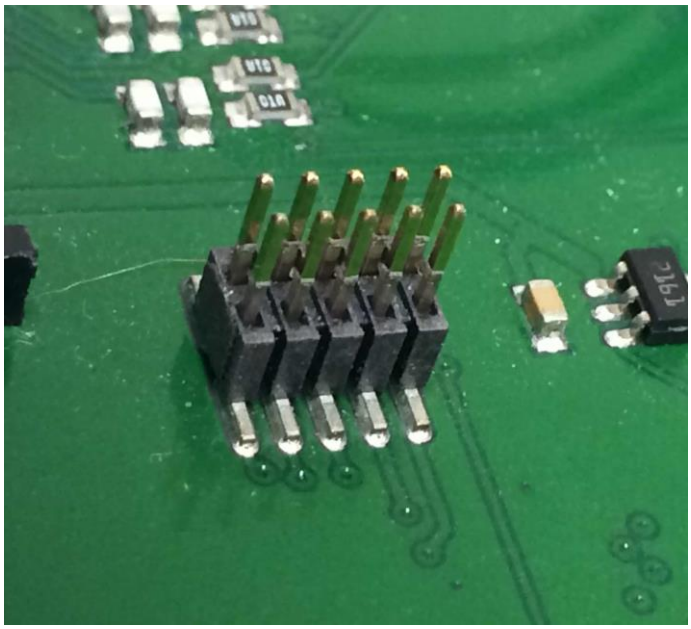


Figure 12. The 10-pin connector on the product PCB.

The mainboard and backend processor connectors are located on the main PCB. To get to the PCB, the side panel opposite to the excitation filter access panel needs to be removed. 6 screws need to be removed as shown in Figure 13.

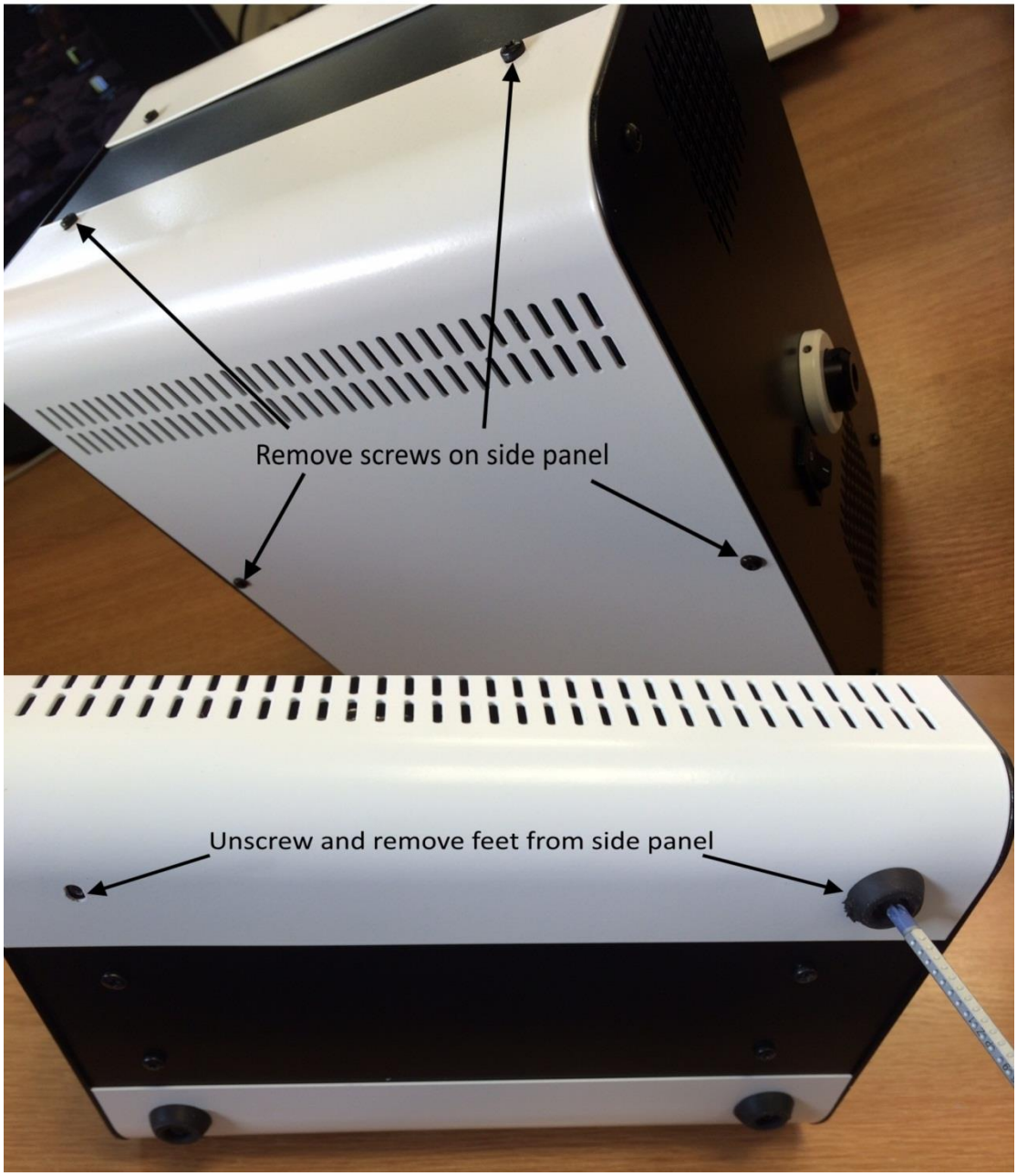


Figure 13. Side panel screws that need to be removed.

When reassembling the light source the screws holding the rubber feet in place should not be over tightened.

The pE-4000 needs to be switched On for the programming to proceed.

Plug the connector from the dongle to the appropriate 10 pin connector on the PCB, being careful to get the cable orientation correct. Figure 14, 15 and 16 shows where the cable should be connected on the pE-4000 main board to update the firmware on the main processor.

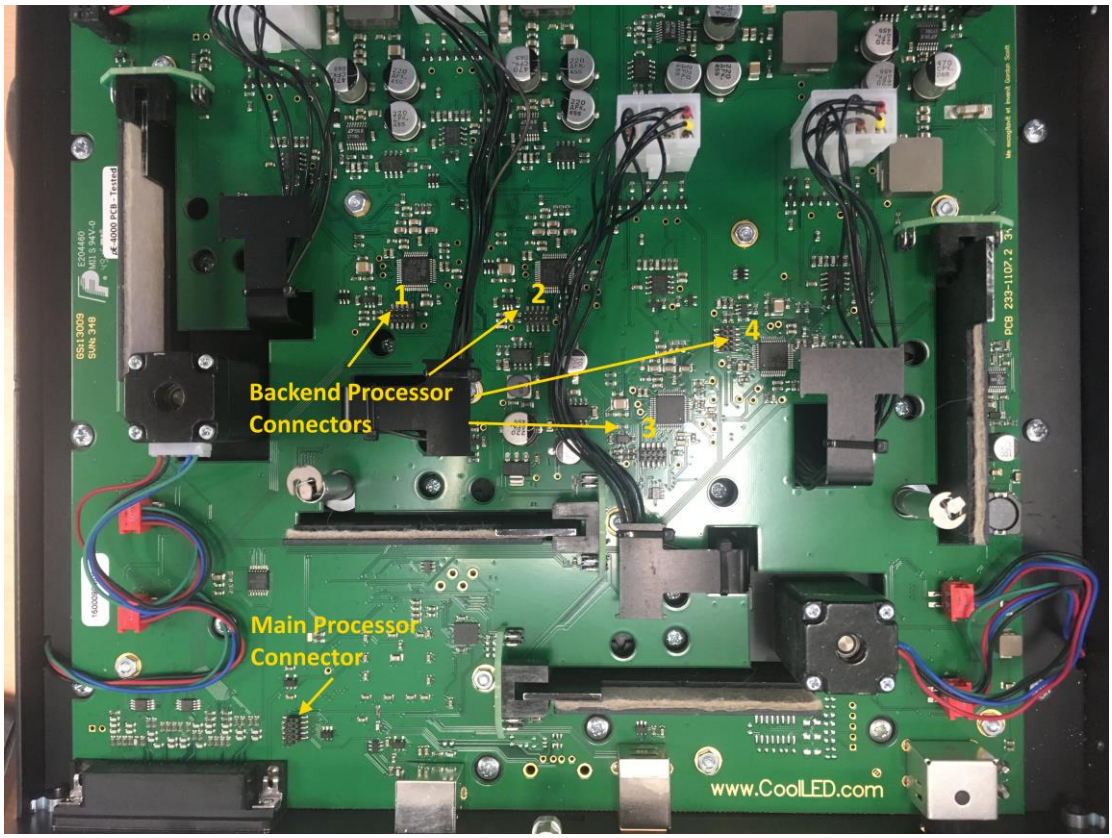


Figure 14. Processor connector positions for updating firmware.

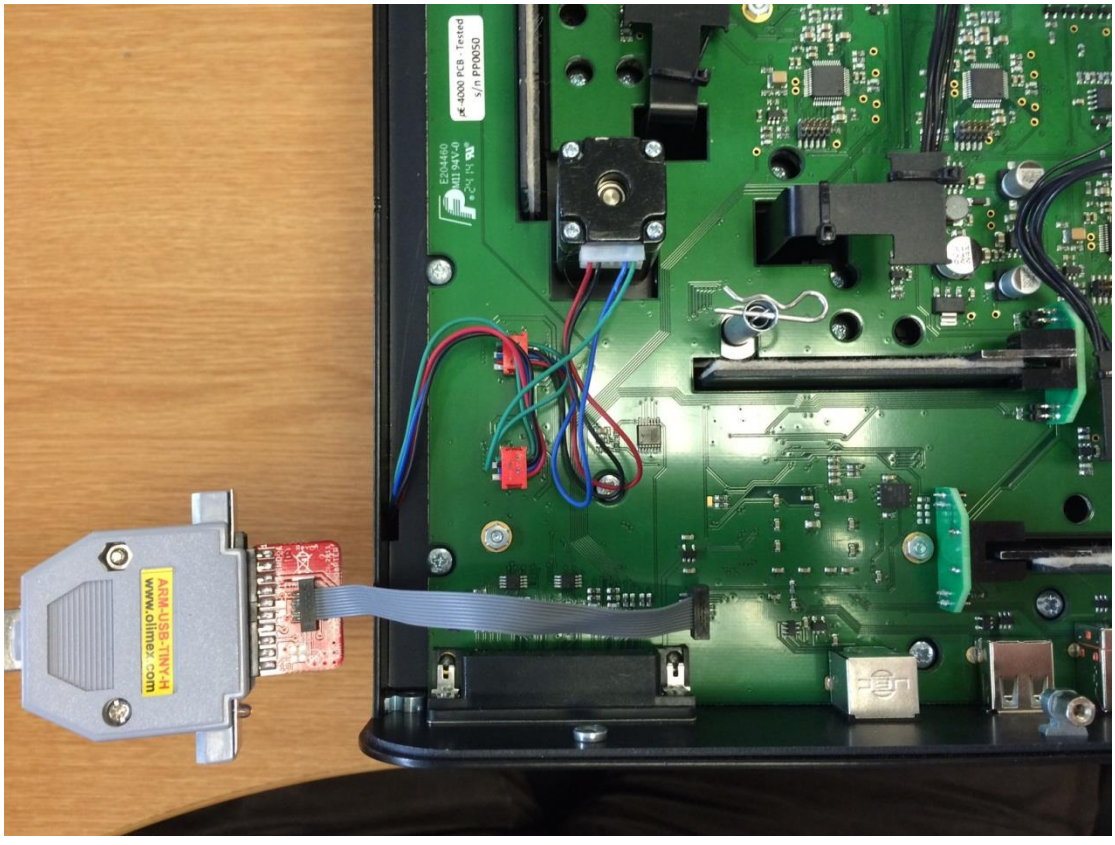
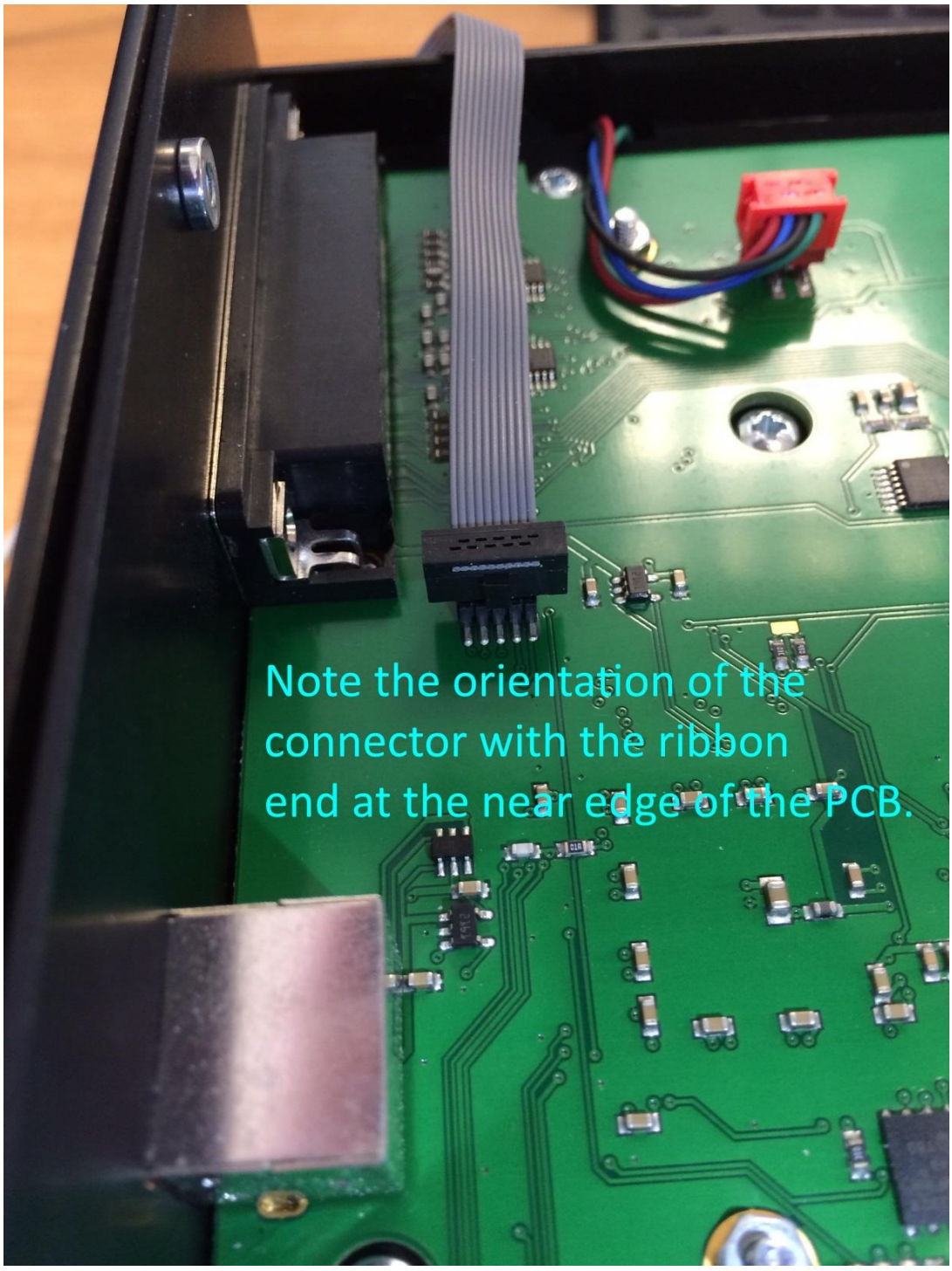


Figure 15. Main processor connection.


Note the orientation of the
connector with the ribbon
end at the near edge of the PCB.
Figure 16.

Once connected press the ‘Program’ button. The following screens will appear with the ‘Messages screen reporting the lines ‘Programmed. Verified. Run.’, confirming that the programing has completed.

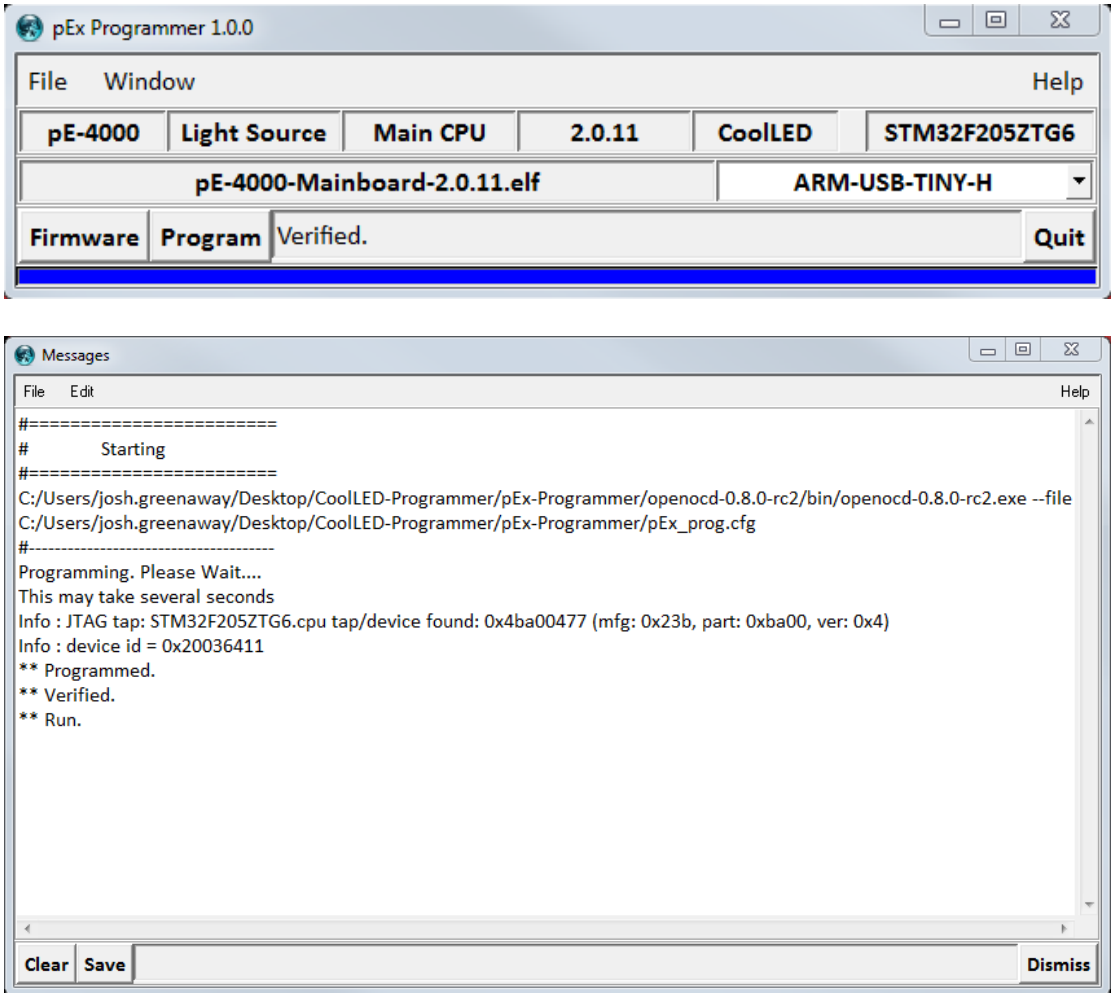


Figure 17.

The update is now done and the dongle can be unplugged from the light source PCB.

A similar procedure is followed using the pEx Programmer to update the firmware on the pE-4000 four backend processors and the pE-4000 control pod. Figure 14 and Figure 18 a-d show the connector positions for the backend processors on the pE-4000 main PCB. Attention should be paid to the cable orientation on the in Figures 18 a-d.

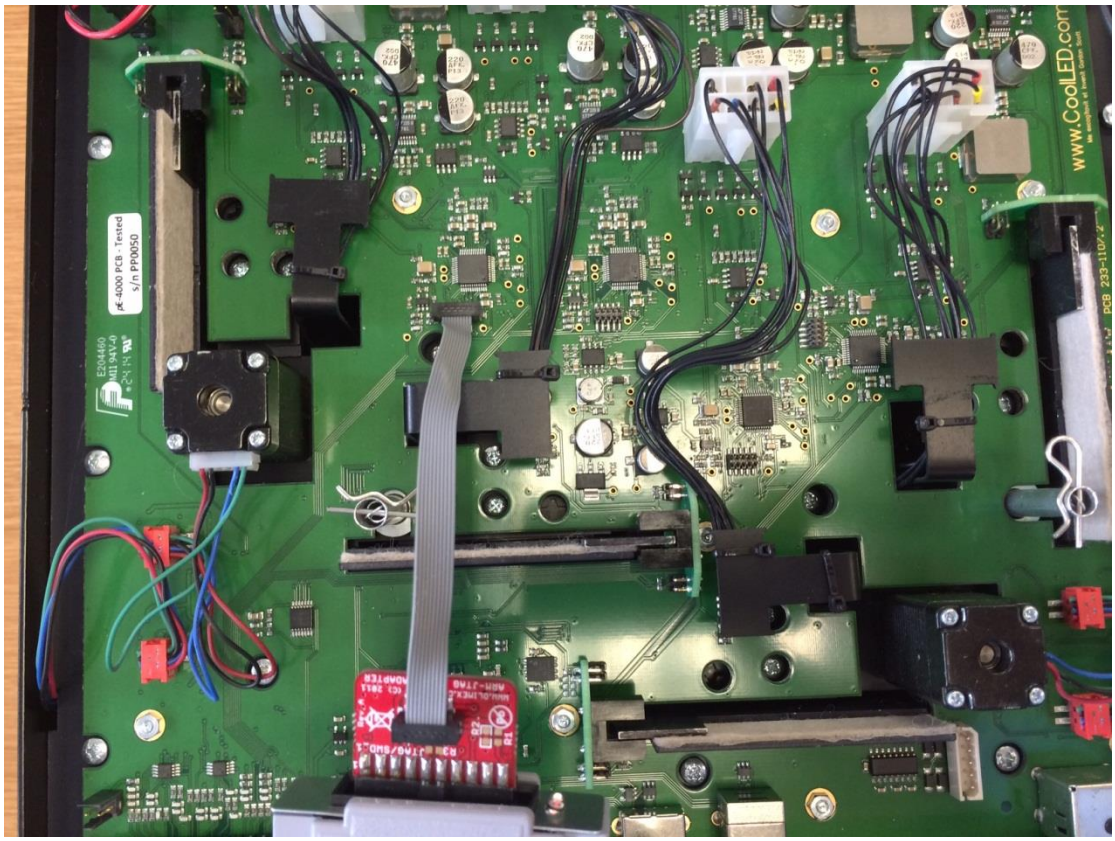


Figure 18a. Backend processor 1.

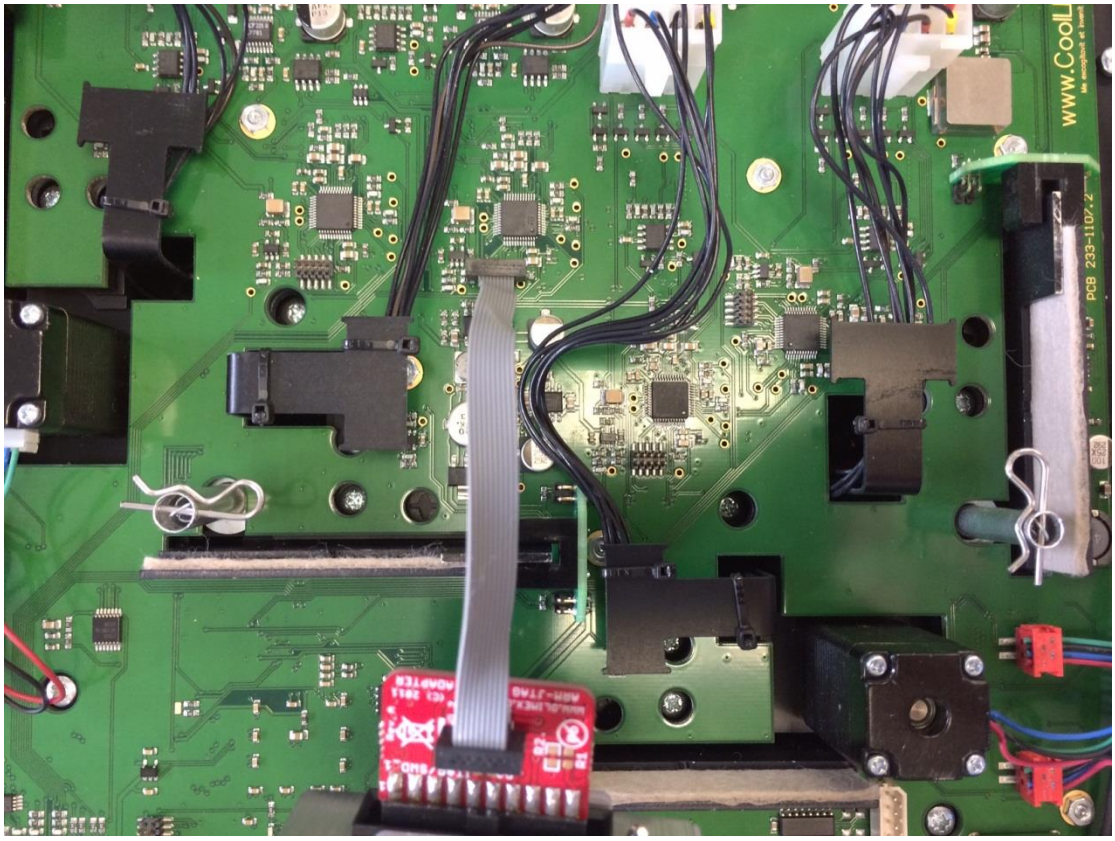


Figure 18b. Backend processor 2.

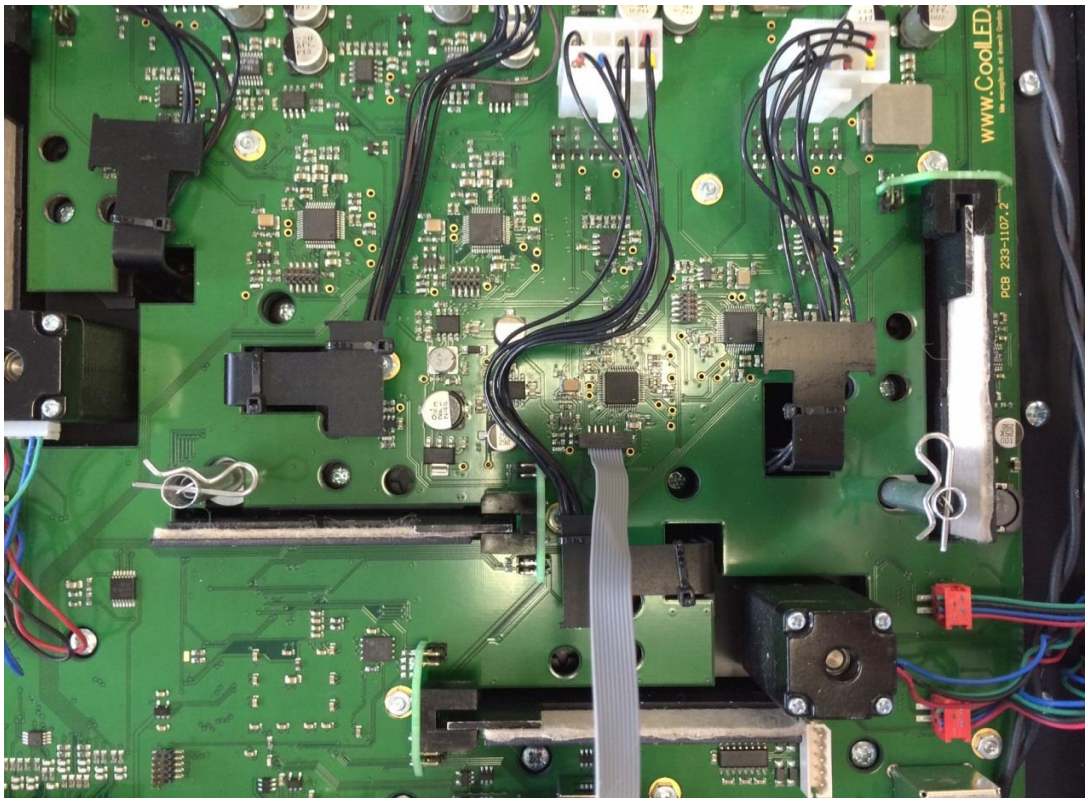


Figure 18c. Backend processor 3.

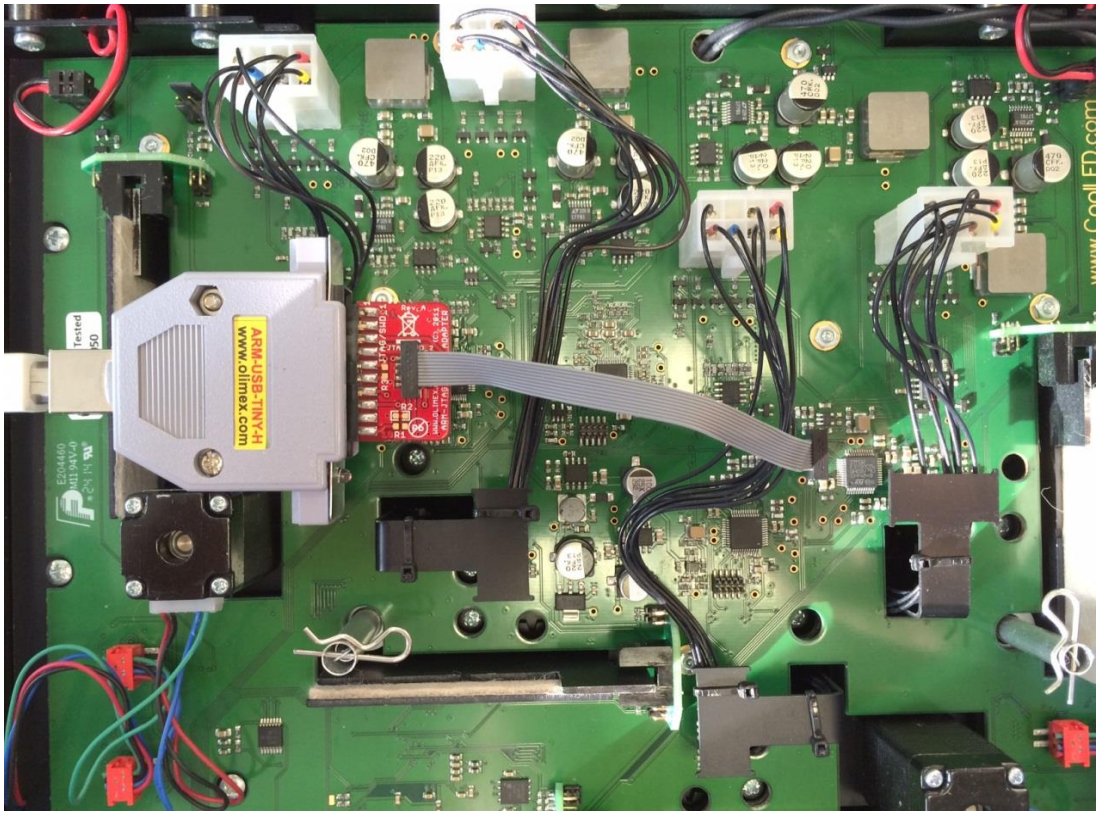


Figure 18d. Backend processor 4.

Figure 19 shows the control pod screws that need to be removed and Figure 20 shows the connector position and lead orientation for updating the pE-4000 control pod processor. The control pod needs to have power to it before the programming can proceed. The control pod should be plugged into the pE-4000 light source and this should be switched on while loading the firmware.

Figure 19.

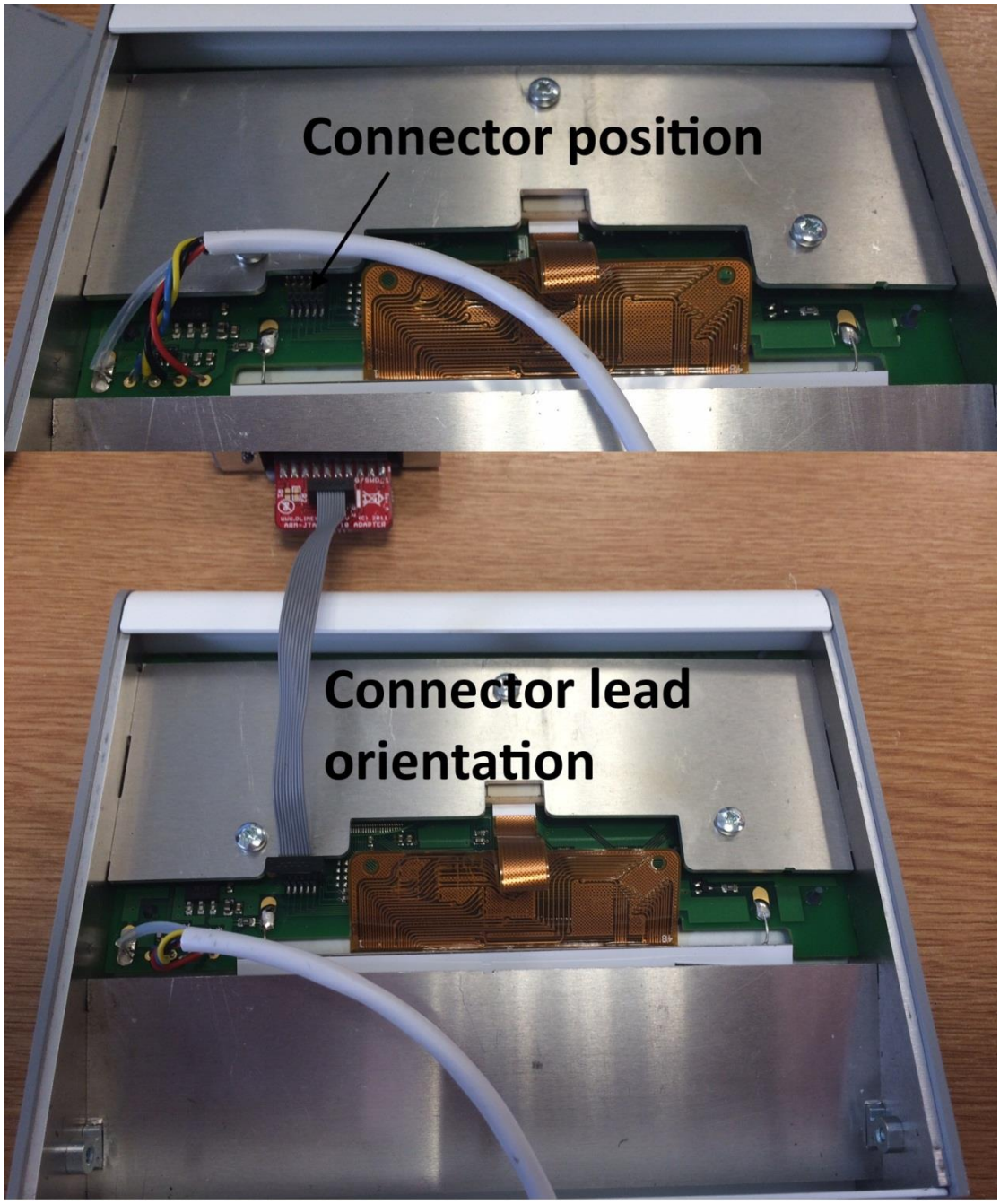


Figure 20.

After the updates the firmware levels can again be checked on the control pod screen as explained in chapter 2 of this document.

Please contact support@coolled.com if you have any questions.